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CENTURIES SEPARATE citizens of Venezuela. The Caracas girl, right, may make her living by the typewriter. She visits art museums, watches television, and rents an apartment in a modern building. The Piaroa Indian boy, below, gleans a living in the jungle, hunting, fishing, and cultivating yucca. He, too, lives in a kind of apartment house—a communal hut that houses the whole village.

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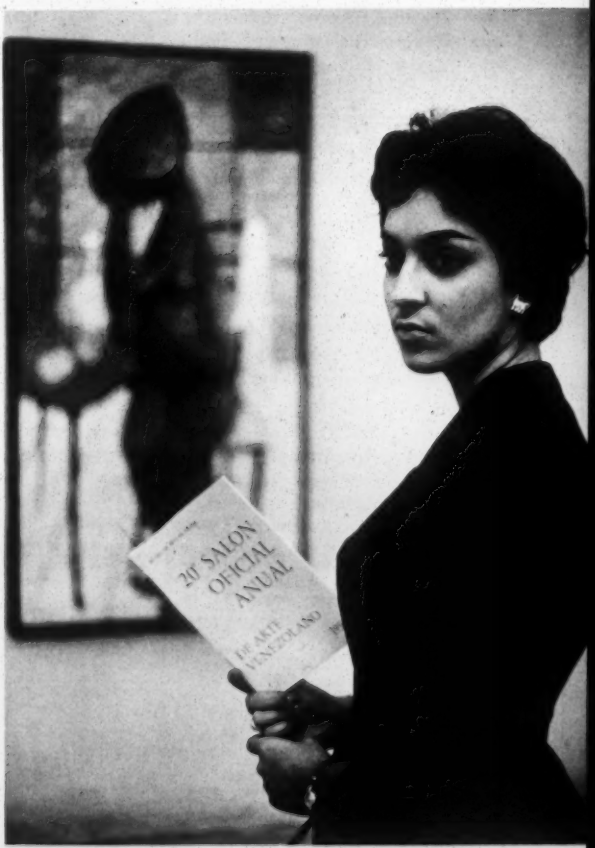

PHOTOGRAPHS BY THOMAS J. ABERCROMBIE, NATIONAL GEOGRAPHIC STAFF

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CONTEMPORARY CARACAS is a showcase for modern architecture. Beside Avenida Bolivar, the traffic-jammed main boulevard of the capital, towers of new buildings knife the sky. This one houses government offices as well as private stores. Others, many of them lemon yellow, red, white, or ultramarine blue, outshine the native bougainvillea and the bright toucan birds. The cultural as well as political hub of the nation, Caracas is the site of many museums and schools.

still harvest the gold that lured the Spaniards. But it was more than four centuries before the country's real wealth—oil—was exploited. Venezuela is the world's largest oil exporter and ranks second only to the United States in production of crude oil.

The oil boom, begun in earnest after World War I, shoved the nation into prosperity. The government initiated a program of "sowing the oil"—plowing the profits into development.

Caracas, capital of the nation and home of about 1,000,000 of Venezuela's 6,000,000 people, was transformed from a city of quiet Spanish charm to a bustling metropolis. It boasts some of the most striking modern architecture in the world. It is plagued by a shortage of parking spaces for a flood of imported new cars.

The oil explosion laid highways, like the new *autopista* that cuts through the Cordillera de Venezuela on its way from the Caribbean to mountain-rimmed Caracas. The boom also built schools, railroads, hospitals, and housing projects.

Money flowed into industry and agriculture. New factories rose to make

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Oil Fuels Venezuela's Growth

Photographs by Thomas J. Abercrombie, National Geographic Staff

THE GOLD in El Dorado is black. It gushes from the man-made forest of derricks on oil-slicked Lake Maracaibo (above), from the Maturín Basin in the northeast corner of the country, from a section of the *llanos* country south of the mountains. In less than 40 years a steady stream has transformed Venezuela from one of South America's poorest countries to one of its richest.

At the north of the South American continent, Venezuela shares its frontiers with Colombia on the west, British Guiana on the east, and Brazil on the south. The Caribbean Sea washes the northern shores.

It is larger than Texas plus Oklahoma, and has not nearly enough people to fill it up. Fewer than 11 persons per square mile live in the most inhabited section. Less than one per square mile is the average in most of the country.

Most Venezuelans live in the north, where the steaming coastal lowlands of the Maracaibo oil fields give way to the coffee trees of Andean hillsides, and the snows of cloud-scraping peaks.

Between the mountains and the Orinoco River stretch the llanos—plains—where barefoot cowboys ride herd on the Venezuelan cattle industry (below).

Beyond the Orinoco lie the Guiana Highlands, an area of dense tropical forest and site of Angel Falls, the world's highest waterfall, with a sheer drop 15 times higher than Niagara.

Columbus saw the coast of this Cinderella land in 1498 on his third voyage to the New World. A later Spanish explorer named it Venezuela (Spanish for "little Venice") when he saw natives living in houses built on stilts over Lake Maracaibo, as the Venetians live above the waters of the Adriatic Sea.

The Spanish combed the country in their search for the legendary golden city of El Dorado. Today Venezuelans

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inexperience, brought the Venezuelans little except chaos. There were 50 revolutions before 1900. Eighteen different constitutions were adopted within 115 years.

Dictators replaced the Spanish masters after the war for independence. The rule of a "strong man" prevailed generally until 1958, when the last revolution put in office a new president, known as an enemy of dictatorship.

Rómulo Betancourt wants to accomplish much that was neglected by the old regimes. He wants to reach the corners that the oil boom has left untouched.

While oil fills many pockets, others remain almost empty. High in the Andes, men plow with teams of oxen. Thatched houses on hillsides are surrounded by tiny patches of wheat and potatoes.

Less than 100 miles from the oil port of Maracaibo, the Guajiro Indians cling to a way of life little changed since the Spanish conquest.

Their home is in the arid, inhospitable Guajira Peninsula, shared by Colombia and Venezuela. Nomads, they wander over bleak and sandy scrub, hunting with bow and arrow, seeking water and forage. They depend for meat on goats, sheep, and pigs. Small game, wild seeds, and the pulp and fruit of thorny plants supplement the diet. Fish, lobsters, and crabs are hunted along the coast. A few groups, settled in rare pockets of fertility, cultivate crops.

Other tribes, even more remote, shun all contact with strangers. L.B.

OUTSIDE CARACAS, OLD WAYS remain. Guajiro Indian women, above, in loose-fitting gowns, tote their produce to the Monday market in Maracaibo. Man and *muchacho*—boy—of the Venezuelan Andes, right, huddle in their woolen ponchos against the mountain cold. It is a far cry from bustling Caracas, where merchants sell jeweled toys and washing machines to luxury-hungry customers.

The government's aim now is to stretch the revenues from the oil fields and iron mines to benefit more people. Rural Venezuela so far has profited little from the national wealth. About 80 per cent of the families in the country earn less than $270 a year. Illiteracy is common. Nearly half the nation's children have never been to school, but education is now expanding. New plans call for extensive rural housing, medical centers, and water supply and sewage systems.

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cement, tires, vegetable oils, and textiles. Oil revenues were poured out for more irrigation, tractors, and farm education.

Nor is oil the only natural resource making Venezuela rich. Two fabulous iron deposits lie in the wild interior. Including similar lodes, the nation's reserve of top-quality iron may total 2,000,000,000 tons.

New roads and railroads reach inland toward the ore. River ports and sea outlets have grown. Important deposits of manganese, bauxite, phosphate rock, sulphur, mica, and asbestos have been found. Old coal mines have been reopened to feed a steel mill.

Diamond mines, begun in the 1930's, continue to yield. Venezuelans still operate pearl fisheries once exploited by Spanish conquistadors. Atomic-age uranium, thorium, and beryllium lie beneath Venezuela's surface.

The country's riches soar beyond the wildest dreams of even the gold-grasping Spaniards who first settled there.

The news of Columbus's discovery of what he called an "earthly paradise" sent Spaniards across the Atlantic to Venezuela, first to harvest the rich pearls of Margarita and Cubagua Islands off the coast, then to seek the gold of El Dorado.

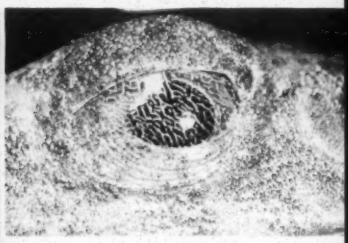
They spread along the mountainous coast, founded Caracas, and built cities in the Andes. They carved out little kingdoms for themselves. Unsatisfied with the Indians who worked their gold mines and their cacao and sugar plantations, the Spanish imported Negroes from Africa. Today's Venezuelan is often a mixture of white, Indian, and Negro. Few pure blood streams are left.

By early 19th century, the Venezuelans found their country something less than an "earthly paradise," due to Spanish colonial policies, especially Spain's official discrimination against Spaniards born in Venezuela.

So, led by Simon Bolívar, the nation declared its independence from Spain in 1811. Ten years of fighting sealed it. But still the century which followed produced no paradise.

Venezuelans inherited from their Spanish ancestors a language and a religion—Roman Catholicism. They kept many customs and an architecture—a Spanish-style cathedral in Bolívar fronts on a Spanish-style plaza, above.

But they also inherited the Spanish ruling system: power for a small minority, which stifled any growth of democracy. These customs, and political



ROBERT HERMES

HUNTING EYES—The giant tree frog's eyes bug out in search of food (left). When resting, they retract (far left). The frog can pull up a lower eye lid (above) that disguises it from prey or enemies while still allowing some vision.

SIMPLE EYES ring a grass spider's head, (below) letting him peer nearsightedly in eight directions at once. Long hairs in the foreground are sensitive to touch. This specimen, which usually lurks in a web spread near the ground, was photographed in Maine. Most of the other pictures on these pages were taken in Washington's National Zoological Park. This selection was made from about 500 eye close-ups by Mrs. Warner.

SHIELDS AGAINST GLARE take many forms. The human iris closes in a circle in bright light. The Palau Island gecko (above), a night-hunting lizard, squeezes together the uneven edges of its pupils to leave only four pinholes. The skate (below), a bottom-dweller in the sea, stares out from a Venetian blind of slats hanging from the top of the iris. Despite them, he sees but one image. Other animals have pupil shapes like hourglasses, horseshoes, keyholes. F.S.

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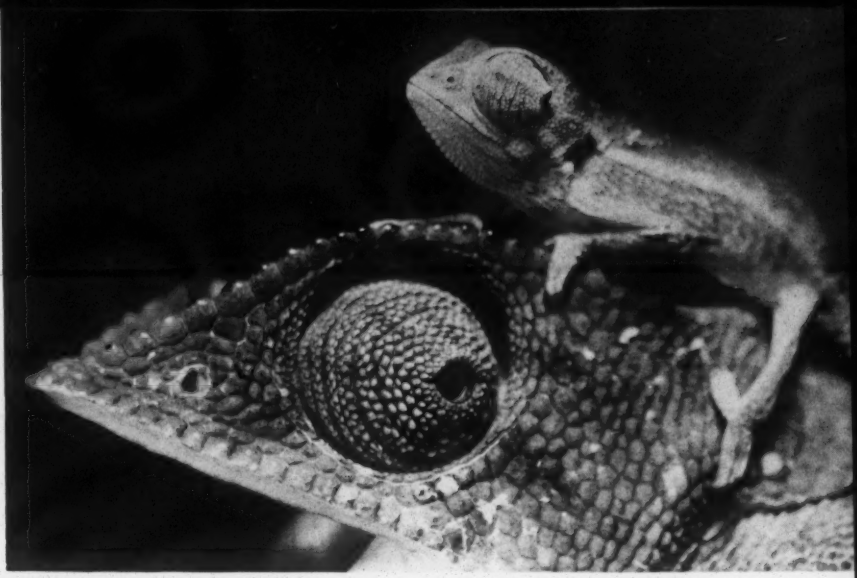

ERNEST P. WALKER

Watchful Animal Eyes

WHETHER ARMORED with scales, fringed with feathers, or split into 7,000 parts, eyes are the most important sense organs to most animals. For each, nature has arranged eyes appropriate to its habits. The African chameleons (above) have eyeballs protected by juglike structures. They can look backward with one eye while looking forward with the other. Most of the pictures on these pages are the result of 10 years' work by Mrs. Constance P. Warner, with the help of the *National Geographic* photographic experts. (See *National Geographic*, April, 1959.)

AVIAN LASHES are modified feathers, like those around the beady eye of an African ground hornbill, above. The fast-flying horsefly, like the fastest birds, has big eyes (right). His 7,000 facets are divided between large upper ones that send the brain bright, coarse images, and lower ones that pick up finer detail.

The Village Freedom Built

north have found new homes with the help of United States aid (GSB, January 12, 1959). The government has opened new areas to the plow, encouraged citizens to move in.

One new village is Dong Hai, which lies a day's bullock ride from the capital, Saigon. Farming rich delta land of the mighty Mekong, Dong Hai concentrates on growing rice.

Like peasants throughout Viet Nam, the Dong Hai farmer puts in a hard day. He rises at cockcrow, wakes his wife, hitches up his water buffalo and heads for his paddies, his older sons trailing behind him. In transplanting and harvest seasons, he summons the whole family to help in the fields.

Eight families raise tobacco. At left a farmer sprays the pulverized leaf with a starch solution he mixes in his thatched home. Vietnamese say the starch improves the taste.

From rice paddy and his back-yard vegetable patch comes the farmer's food. His wife buys a few staples from one of the village groceries. Here, the family enjoys lunch. A.P.M.

MOST DONG HAI farmers maintain their own garden plots. The hard-working peasant, left, waters his vegetables with shoulder-hung sprinklers. The rich delta earth yields kohlrabi, carrots, corn, sugar cane, soya, and a variety of beans. Some villagers also keep ducks and pigs.

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PHOTOGRAPHS FROM INTERNATIONAL COOPERATION ADMINISTRATION

THREE-FOURTHS of Viet Nam's people live in agricultural villages like Dong Hai. Carefree children, above, dash down the main street of the village. Stacked wood comes from trees felled to clear land for the new village. Almost half the country is still covered by forest.

Most of Viet Nam's limited industry is located in Saigon. But small "cottage industries" spring up in the towns. Abundant clay makes brickmaking suitable in Dong Hai. Right, the co-owner of the village brickyard, Nguyen Van Ngoc, lays a block of molded clay on the ground. When he has enough he will place the clay blocks in a charcoal-fueled kiln to bake. A helper in the background unloads a fresh batch of clay. This brickmaker turns out 15,000 bricks a month. They are used to construct permanent buildings like Dong Hai's three-room schoolhouse.

DONG HAI—

IT HAS BEEN five years since Viet Nam was split in two, Communists taking the northern half, loyal Vietnamese the southern. Stories leaking from the north today tell of floods and hunger. But for those living in the free south—city dweller and village farmer alike—the years have proved surprisingly kind.

With partition, the Republic of Viet Nam gained its independence from France. Under an energetic president, Ngo Dinh Diem, Vietnamese have found a new national unity, even limited prosperity. Most of nearly one million refugees who fled terror in the

during which 80,000 cubic yards of rock were dumped into the breach, the tide was stemmed, making the Colorado again empty into the Gulf, and leaving a brand-new sea—40 miles long and from 7 to 14 miles wide—sitting in the lowest part of the saucer. Canals and upstream dams, including Hoover Dam, now protect the valley by taming the river. Salton Sea laps peacefully against its desert shoreline.

The sudden mating of sea and desert has created a strange world. Barnacles, introduced inadvertently by boats or seaplanes during World War II, grow on drowned sagebrush. Gulls circle lazily under the pale desert sky. Gentle sea breezes temper the desert's heat. Dust storms swirl over blue water.

The Sea lies in the second lowest spot in the United States. It is 235 feet below sea level; Death Valley, 282 feet.

The Salton Sea is a salt sea; minute quantities of minerals carried in by the Colorado have built up as the desert sun evaporates the water. Today its salinity about equals that of the Pacific Ocean, 80 miles to the west.

The combination of dense water, giving propellers more "bite," and low altitude, giving better combustion in engines, with the usually smooth surface of the Sea, has made Salton a favorite with speed-boat enthusiasts. More than 40 world records have been set there.

Other sportsmen come for water skiing or fishing. At first there were few fish, but a stocking program has introduced several species.

The Gulf croaker has been brought in as a food fish for the bigger corvina. Since Salton lacks the reefs of the Gulf of California, usual home of the corvina, artificial reefs of junked automobiles have been dumped in.

Along the northeast shore, Californians have built the Salton Sea State Park. Most popular during the winter months, the park offers campsites, picnic areas, a bathing beach, and launching ramps for boats.

Wintertime is preferred because in summer temperatures reach 120° in the shade. When the first developers talked of irrigating the floor of the basin,

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PHOTOGRAPHS BY CHARLES W. HERBERT

Salton, the Sea in the Desert

LIKE A VAST MIRAGE, water lies in the desert among the bare brown hills of Southern California. But it is real enough to the swimmers sunning themselves on its sandy shore.

This is Salton Sea—the world's newest, poured by mistake into a desert sinkhole.

The story begins back in the Tertiary Age, some 20,000,000 years ago. A series of upheavals left a jagged scar, or fault, stretching northward from the pointing finger of the Gulf of California.

Gulf waters rushed in, and the finger lengthened.

Then the Colorado River, wandering down from the northeast, deposited in the Gulf—where the upper knuckle would be—ton after ton of silt it had carved from the Grand Canyon. Eventually, it built a delta that cut the Gulf in two, making the "fingernail" an isolated salt lake.

The scorching sun dried up the lake, leaving a dry "sink" or basin. Over the centuries the mighty Colorado changed its course many times, now spilling into the basin to create a lake, now rushing past to the Gulf while the lake dried up.

Pioneers and gold-seekers hurrying to the Pacific Coast found the Salton Sink a scorching plain, strewn with bleached bones. Beneath this death mask lay treasure—rich layers of soil dropped by the outlaw Colorado. Only the sweet touch of water was needed to turn it into a garden.

At that time—as now—the Salton Sink resembled a vast saucer, with the Colorado River rolling through its own trough along the eastern rim. Developers realized that if a canal were cut through the rim, Colorado water could irrigate the sink.

This was done, and the big spigot opened in May, 1901. Settlers rushed to Salton Sink, renamed the Imperial Valley. Crops, such as the lettuce below, spread rich quilts.

For three years all went well. Then the river got out of man's control. Rushing through a new canal outlet, the Colorado flooded the valley, carving a new bed and dumping innumerable gallons of water into the "saucer." Farms were washed away as settlers frantically tried to harvest crops before the waters covered them. The Colorado's normal channel to the Gulf dried up completely, and the entire river raged into the sink.

After a three-year, $3 million struggle,

Irrigation Creates a Green Checkerboard in Imperial Valley

they were laughed at. "No man can work in that heat," they were told.

But men do work in it without trouble. The Imperial Valley now ranks as the seventh county in the United States in terms of the value of crops raised.

The hot sun draws plants out of the rich soil in record time. Tender grapes, lush melons, rich barley and cotton, fat sugar beets flourish in the Imperial Valley south of Salton Sea and in parts of the Coachella Valley to the north.

Water churning through the All American Canal—the 1940 successor to the canal that almost destroyed the valley—feeds groves of date trees imported from the Middle East. The National Date Festival is held each February in the Coachella Valley to celebrate the success of this migration.

Sun and water hang citrus trees heavily with fruit—it takes about 1,250 glasses of irrigation water to make one glass of orange juice for your breakfast.

"We don't pray for rain," one farmer told *National Geographic* assistant editor Mason Sutherland. "We telephone for it."

A call to the irrigation district brings the amount of water needed. Real rain—about three inches falls in a year's time—is not a factor.

The pilots of the jet planes in the picture above can look down and see the difference flowing water makes. Where its life-giving touch falls, green fields burgeon. Without it there is dead sand.

The view reminds travelers of the shores of the Nile, where you can walk with one foot in rich farmland, and the other in barren desert.

Even thirsty crops do not drink all the water that ripples in the All American Canal. Water is left over to feed the Salton Sea, and make up for the enormous evaporation the desert sun produces. In recent years the Sea has been growing—one resident has been forced to move her house back three times.

Specialists believe, however, that the inflow and evaporation will soon be in balance, stabilizing the Sea and its rich farming and vacation lands. B.B.—F.S.

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